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1 Extending the scope of community pharmacists' practice to patients requiring urgent care –
2 an evaluation of a training programme using the Theoretical Domains Framework

3 Sarah C Willis* (BA, MA (Econ), PhD)¹

4 (sarah.willis@manchester.ac.uk)

5 *Senior Lecturer in Social Pharmacy*

6

7 Elizabeth M Seston (BA, MA (Econ), PhD)¹

8 (liz.seston@manchester.ac.uk)

9 *Research Fellow*

10

11 Hannah Family (BSc, MSc, PhD)²

12 (h.e.family@bath.ac.uk)

13 *Research Fellow*

14

15 Samantha White³

16 (samantha.white@cppe.ac.uk)

17 *Regional Manager, CPPE*

18

19 Christopher Cutts³

20 (christopher.cutts@hee.nhs.uk)

21 *Director, CPPE (at the time of the study)*

22

23 ¹Centre for Pharmacy Workforce Studies

24 Division of Pharmacy and Optometry

25 School of Health Sciences

1 Faculty of Biology, Medicine and Health

2 The University of Manchester

3 Oxford Road

4 Manchester M13 9PT

5

6 ²Department of Pharmacy & Pharmacology,

7 University of Bath

8 Bath BA2 7AY

9

10 ³Centre for Pharmacy Postgraduate Education

11 The University of Manchester

12 Oxford Road

13 Manchester M13 9PT

14

15 ***Author for correspondence:**

16 Dr Sarah Willis

17 sarah.willis@manchester.ac.uk

18 Tel: 0161 – 275 5894

19 Fax: 0161 – 275 2416

20

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24

Abstract

Redesigned health systems could meet the rising demand for healthcare, with community pharmacy currently an under-used resource for the treatment and management of patients requiring urgent care. This study aimed to investigate whether a training intervention delivered over two days to community pharmacists resulted in behaviour and practice change. Validated measures of psychological motivation and capability factors relevant to understanding behaviour and behaviour change were collected one week before, one week after and two months after training in a non-controlled before and after study design. Two targeted behaviours of the intervention were the primary outcome measures: taking a structured history; and applying clinical examination techniques to patients requiring urgent care. Secondary outcomes measured participants' reported patient management behaviours to investigate possible bridging of gaps in the health system. Training was provided in 14 locations in the UK to 258 community pharmacists, with data collection occurring July 2015 – September 2016. In total, 81 participants completed all three rounds of data collection (31.4%). Findings suggest that one-week post-training significant changes in psychological capability had taken place, and that these were sustained two months later: of the eight domains influencing behaviour and stimulating behaviour change, knowledge, skills, professional role, beliefs about capabilities and goals all increased significantly between T1 and T2, and T1 and T3 (all $p < 0.0001$). At T3 participants were more likely to have taken a structured history than performed a clinical examination, and reported both managing patients themselves and changing referral practices to other healthcare providers. Participants reported workload and the need for liability insurance as structural and contextual barriers to implementation. While findings suggest the potential to transform models of care through training to extend community pharmacists' practice these barriers to successful implementation of the urgent care service would need to be addressed if this service is rolled out nationally.

1 **Keywords:** Community pharmacy; urgent care; behaviour change; implementation; workforce;
2 clinical examination

3

4 **What is known about this topic:**

- 5 • Health systems are under pressure to meet growing patient demand. To address this new
6 models are needed to deliver care in the right place from the right provider
- 7 • Community pharmacy has the potential to contribute to meeting demand for urgent care,
8 having already effectively and efficiently transferred care away from general practice and
9 hospital emergency departments for the treatment of patients presenting with minor ailments

10 **What this paper adds:**

- 11 • Community pharmacists can extend the scope of their practice to the treatment of patients
12 requiring urgent care following training
- 13 • Training has a sustained impact on community pharmacists' practice but further health systems
14 support is needed if implementation of training is to transform models of care

1 Introduction

2 Meeting the health needs of the growing number of patients with multiple chronic conditions,
3 especially those of an ageing population, is a recognised challenge for healthcare systems worldwide
4 (Yach et al., 2004; World Health Organisation, 2011; Mossialos et al., 2015). To address this challenge,
5 policy-makers advocate taking an approach that focuses on the interplay of different parts of a health
6 system – and in particular on how services are provided, the professions providing services, and on
7 the institutions or context in which care is provided – and how this can be better connected in order
8 to establish a system of integrated care, leading to improved patient outcomes and enhanced
9 efficiencies (Leutz, 1999; Gröne & Garcia-Barbero, 2001; Starfield & Shi, 2002; Starfield, Shi & Macinko
10 2005).

11
12 Designing and implementing an integrated health system is likely to require some reorganisation of
13 primary, mental and acute care in order to deliver the right care to patients, at the right time, in the
14 right place, from the right provider (NHS England, 2014). It is also likely to require resources to
15 support capacity-building to enable effective delivery of care at a number of levels, including
16 knowledge and skills training for practitioners (capacity-building at the individual level), and expansion
17 of support and infrastructure (capacity-building at the contextual, organisational and macro levels) to
18 produce strategic benefits to a health system (Murphy et al., 2014; Bergeron et al., 2017). Yet most
19 capacity building addresses the individual level because organisational and macro level changes are
20 not within the scope of interventions that aim to enhance individual capacity, and instead include
21 some elements of how address barriers to implementing knowledge and skills in practice in the
22 training.

23
24 Recent proposals to transform urgent and emergency healthcare services include using community
25 pharmacies as an alternative provider to higher cost, out of hours and emergency departments (Curley
26 et al., 2016; NHS England, 2013). Community pharmacy already provides a range of commissioned

1 clinical services that contribute to improved patient outcomes, are effective (in terms of process
2 measures), cost effective (when comparing the cost of community pharmacy with other providers)
3 (Wright, 2016; Murray, 2016; Watson et al., 2015) and offer direct savings in terms of other health
4 services avoided (such as GP and emergency department visits) (Ramalho de Oliveira et al., 2010).
5 Recent estimates that community pharmacy could safely treat more than 10% of general practice and
6 5% of emergency department consultations (Fielding et al., 2015), at a substantially lower cost
7 (Watson et al., 2015; Baqir et al., 2011), and growing evidence that pharmacies can feasibly and
8 appropriately improve access to treatment in particular for low income groups (Rafferty et al., 2017),
9 suggest that community pharmacies have a place in the healthcare system for providing primary
10 health care for certain common, self-limiting or uncomplicated conditions efficiently and at scale
11 (Curley et al., 2016; Watson et al., 2015; Bell et al., 2016), although uptake of services remains low
12 and suggests that lack of awareness amongst patients may restrict the impact on health systems of
13 community pharmacy services (Eades Ferguson, & O'Carroll, 2011; Saramunee et al., 2014).

14
15 Utilising community pharmacists to manage minor ailments such as allergies, conjunctivitis and thrush
16 has been part of commissioned pharmacy-based minor ailments schemes (PMASs) for a number of
17 years. Within PMASs patients can receive a pharmacist-prescribed medicine from a restricted
18 formulary; however, there is potential to expand the range of conditions and manage the referral
19 pattern of pharmacists with further training to the assessment, triage, advice and treatment of a range
20 of low acuity conditions (e.g. otitis, red eye and some skin conditions). For such training to have an
21 impact on patient demand for treatment of these conditions it will be important to address both
22 individual and organisational-level factors including lack of confidence and competence to provide
23 new services together with low perceived behavioural control to implement training previously
24 reported as limiting the rate of community pharmacists' scope of practice change (Luetsch, 2016).

25
26 In the study reported here training was offered for community pharmacists to develop clinical and

1 physical examination skills needed to provide urgent care, with urgent care defined as a ‘medical or
2 health related condition needing care on the day’. Training related to a number of body systems
3 including respiratory, eyes, ears, nose and throat, and skin was designed to enable future sustainable
4 healthcare system development through the extension of the current scope of community
5 pharmacists’ practice – that is, it was designed to have an impact on behaviours undertaken by
6 community pharmacists performed as part of their professional duties (practice) rather than to
7 support the development of service-specific competencies. Training also included action-planning in
8 how to respond to organisational level barriers to implementing and sustaining practice change
9 including making time to respond to patients needing urgent care.

10
11 To investigate the extent to which this training was transferred to and implemented in practice, the
12 authors designed a study that applied the Theoretical Domains Framework (TDF) (Michie et al., 2005;
13 Francis, O’Connor & Curran, 2012; Cane, O’Connor & Michie, 2012; French et al., 2012). Based on
14 psychological and organisational theory, the TDF consists of a number of different domains, the
15 majority of which relate to individual motivation and capability factors relevant to understanding
16 behaviour and behaviour change (Atkins et al., 2017). Within the TDF, each domain is made up of a
17 group of constructs (theories and component parts of theories) that have been demonstrated to
18 influence behaviour and stimulate behaviour change.

19
20 The TDF not only provides a framework for understanding health professional behaviour change
21 processes, it also provides exemplar questions for measuring the ways that a training input
22 (intervention) is associated with particular ‘target’ behaviours (practice outcomes) (Michie et al.,
23 2005; Francis, O’Connor & Curran, 2012). Thus using the TDF in our study allowed us to examine, from
24 a theoretical and empirical standpoint,. The success of the intervention in changing behaviour in our
25 study is determined via self-report of two target behaviours (primary outcomes): taking a structured

1 history from patients requiring urgent care; and applying clinical examination techniques to patients
2 requiring urgent care. We further investigated four healthcare system behaviours, to assess the
3 extent to which the training may further be associated with change in the provision of urgent care by
4 the right provider (secondary outcomes). Thus the study objectives were to:

- 5 i. Measure motivation and psychological capability factors relevant to understanding behaviour
6 and behaviour change one week before, one week after and two months after training;
- 7 ii. Identify the extent to which target practitioner behaviours of the training (primary and
8 secondary outcomes) were reported as performed in practice;
- 9 iii. Investigate whether target practitioner behaviours of the training (primary outcomes) were
10 associated with motivation and psychological capability factors

11
12 As well as measuring self-reported behaviours we explored participants' implementation intentions
13 to provide insight into reported primary and secondary outcomes. These 'self instructions' allowed
14 us to capture insights into individual-level, perceived behavioral control as well as barriers to
15 implementation, such as infrastructural and organisational-level factors, viewed by participants as
16 likely to influence the success or failure of implementation intentions.

1 **Methods**

2 This was a non-controlled before and after study design with data collected cross-sectionally at three
3 time points: one week before training (time point 1 [T1]), one week after training (time point 2 [T2]),
4 and a two months follow-up (time point 3 [T3]).

5 Participants

6 Participants were community pharmacists who completed a two-day residential training course in the
7 assessment and management of urgent cases. All who registered for the course were invited to
8 participate and were provided with participant information sheets (PIS) about the study at each point
9 of data collection. Each PIS included details about the study, what participation involved, and what
10 would happen to data collected so that free and informed consent was obtained on an ongoing basis.
11 When invited to participate pharmacists were assured that they were free to decline but were still
12 eligible to take part in the training.

13 Intervention

14 General practitioner and community pharmacist educators provided training over two days for up to
15 20 community pharmacists at a time. The course used a combination of teaching methods, including
16 short lectures on the theory of medical consultation and history-taking, clinical examination,
17 investigation and management, with learning structured around patient cases related to different
18 body systems. There were also demonstrations with simulated patient actors following which those
19 attending the training had the opportunity to practise clinical examination techniques in small groups;
20 these clinical examinations were videoed with feedback provided. The course finished with action
21 planning, where learners discussed barriers and strategies for providing urgent care for patients as
22 part of their professional duties (practice), to encourage reflection on their individual capacity to
23 implement change and on capacity barriers to change at organisational and structural levels.

24 Procedure

One week before pharmacists were due to attend the training course they were emailed a weblink to an online survey. The email contained a unique identifier for each participant; the use of a unique identifier allowed for data to be collected as linked for the purpose of analysis. Two reminder emails were sent to each cohort of trainees. This procedure for administering study surveys was repeated for each subsequent round of data collection – at time point 2 (T2) one week after the training, and again at T3, two months after the training.

Advice regarding whether ethical approval was required for the study was sought from the first author's institution. The University's central research ethics office viewed the study as course evaluation, and as all data were anonymous, there was no requirement for ethical approval.

Materials

A core set of 20 validated questions (Huijg et al., 2014) was included at each data collection point, with additional questions added at T2 and T3 (see Table 1).

<please insert Table 1 about here>

The core set of questions assessed six TDF domains important for understanding behaviour change in relation to psychological capability and motivation – knowledge; skills; professional role; beliefs about capabilities; intentions; and goals. Sixteen questions assessed constructs within these domain, two questions assessed beliefs about capabilities and the remaining two questions assessed behavioural intentions (see Table 1 for details).

At T2 and T3 two additional domains from the TDF were added: memory, attention and decision making; and behavioural regulation. Four questions reporting the extent to which the training had

influenced a number of healthcare system behaviours, including change in referral to other urgent care providers, were also included at these time points (see Table 2 for details).

<please insert Table 2 about here>

In addition, at T2, participants were asked to complete two free text questions related to implementation goals and intentions, based on the theory of planned behavior (Ajzen, 1991) that setting a self-instruction (an intention) for a behaviour increases the likelihood it will occur. Here, participants were asked to identify a specific plan or intention to enact an urgent care behaviour and to provide information related to the context or environmental conditions under which the action (behaviour) would be initiated to support them in identifying how, when and where they could extend their practice to habitually providing urgent care. Responses given to these free text questions were analysed thematically (Braun & Clarke, 2006) to create categories for a new question at T3, where implementation of goals was followed up, to capture the frequency with which commonly identified intentions were reported as having taken place. Finally, the extent to which the training had extended participants' scope of practice was assessed at T3 in relation to the primary outcomes of taking a structured history and applying clinical examination techniques to patients requiring urgent care (see Table 2 for details).

Analyses

Data were downloaded from the online survey platform; quantitative data were imported into SPSS (Statistical Package for Social Scientists) v22 and qualitative data into Microsoft Word for analysis.

Initially, internal reliability of the domains was assessed using Cronbach's alpha, and internal consistency of domains through Pearson's correlation. Following this, baseline (T1), T2 and T3 domain scores were calculated and subsequently treated as continuous data. Mean domain scores were

1 initially calculated for all respondents completing a survey at each time point before being compared
2 pre and post training (T1 and T2) and between T2 and T3 to determine whether change was sustained,
3 with an ANOVA with repeated measures (Greenhouse-Geisser correction) and post-hoc tests
4 (Bonferroni) for multiple comparisons to determine whether change was significant. For domains with
5 fewer than three time points, a paired samples t-test was used. Implementation of goals was
6 investigated at T3 in relation to the proportion of participants reporting having addressed five goals
7 commonly identified at T2. Reported primary and secondary outcomes data were non-parametric so
8 medians and inter-quartile ranges were calculated. Spearman's Rho correlation test was used to
9 identify associations between T3 domain scores and the primary outcomes for the capacity-building
10 training to identify whether target practitioner behaviours of the training (primary outcomes) were
11 associated with psychological processes regulating behaviour and behaviour change.

12
13 Data analysis was carried by members of the study team who were not involved in the design or
14 delivery of the training (LS, SW & HF) and are independent of the training team.

Results

Participants

Training was held between July 2015 and June 2016, with a total of 258 pharmacists attending 14 events. Participants worked in a range of community pharmacy settings; of those providing details, most were working for a large multiple community pharmacy employer (defined as owning more than 25 stores; 38.1%, n=69) and as a pharmacist manager, (42%, n=90). A further 26.2% (n=56) were working as a locum (self-employed, sessional pharmacists). Participants were in the main female (n=128, 65%), had been qualified a mean of 12.77 years (SD±10.311) and worked full time (65.7%, n=119), suggesting participants were similar to the pharmacy workforce in Great Britain (Phelps et al., 2014).

Questionnaire completion

While the majority of pharmacists completed the baseline pre-workshop questionnaire (n=222; 86%) fewer completed the follow up questionnaires: 63.6% (n=164) completed the T2 questionnaire, 40.3% (n=104) the T3 questionnaire, and 31.4% (n=81) completed all three. Comparing participants' gender, practice setting and length of time qualified between those who completed the T1 questionnaire (n=222) and those who completed all three (n=81) demonstrated no significant differences between the characteristics of those responding at all time points to those who only took part in the initial round of data collection. When comparing change in the domains only results from those who completed all three questionnaires are presented; however, some cross-sectional analysis of domain scores at each time point is also included for completeness.

Internal consistency of measures

Domains possessed good reliability (Cronbach's Alpha > 0.8 for five domains and > 0.6 for two domains), with items within each domain correlated, demonstrating internal consistency between individual items within a domain.

Measures of TDF domains at each data collection point and change in TDF domains

Mean scores calculated for the domains at the different time points are shown in Table 3.

<please insert Table 3 about here>

Cross-sectional scores for all completing a survey were very similar to those who completed all three surveys, with no differences in score reaching statistical significance when compared between groups. All domain scores increased over time, with change statistically significant for five of the six domains measured at all three points, and for one of the two domains investigated post-training only (at T2 and T3) (see Table 3). Post-hoc tests indicate that the significant differences were between the mean score at T1 and those at T2 and T3 for those measured at all three points.

Reported healthcare system behaviours (secondary outcomes)

Overall participants reported practising all four behaviours at follow-up, with little change at T3 compared with T2 (see Table 4) – the median score only increased from 5 to 6 for assessing and managing patients requiring urgent care.

<please insert Table 4 about here>

The qualitative data provide further insight into behavioural intentions to provide urgent care and factors influencing success or failure in implementing urgent care behaviours. In the examples presented we have included identifiers in parentheses; these identifiers denote the

workshop attended (from A-N) with each letter indicating a different workshop together with a unique ID number for the respondent.

Reported implementation intentions suggest that those taking part in the training perceived they had the psychological capacity and were motivated to extend their scope of practice to include patients requiring urgent care. Frequently reported intentions included examples of how participants would implement both target behaviours by incorporating into practice the knowledge, skills and expertise required to depart from the usual boundaries of community pharmacy practice. In particular, intentions to use the structured approach to history-taking by *“us(ing) the ICE and SOCRATES memory aids to work through the patient’s problem whilst maintaining flow of information”* [F-20] to *“think of the whole picture instead of just the presenting symptoms”* [G-01] by *“ask(ing) more details about the history of the presenting complaint as well as family history”* [N-111] and *“asking (patients) for their ideas, concerns and expectations”* [E-12] or *“spend(ing) more time establishing their expectations and reaching a shared decision”* [E-01] were reported. Many stated they would practice structured history-taking to *“manage the condition and only signpost or refer if necessary”* [B-13]. Making an *“informed referral”* [B-09] based on both a patient’s history and following a clinical examination was another common implementation intention:

“I will assess within my ability any symptoms...and I will refer...to the best healthcare provider suitable within an appropriate time frame... whether that be A+E, walk-in centre or GP...I will more confidently NOT REFER simple cases.” [B-20]

While capacity and motivation are important determinants of actual behaviour, a number of implementation intentions suggest participants perceived having low control over the environmental opportunities that would enable them to convert their behavioural intentions into practice:

1
2 *"I will carry out observations of the patient but would probably not carry out a full*
3 *examination due to insurance / liability restrictions."* [C-04]

4
5 *"At the moment I feel trapped by the constraints of...what I can offer due to lack of*
6 *resources to buy equipment...I feel frustrated that I can clearly develop the skills to*
7 *deliver an urgent care service but limited ability to treat on the NHS results often in no*
8 *option other than a GP referral. "* [B-13]

9
10 Participants recognised a further barrier to extending the scope of their practice was workload
11 pressure:

12 *"Work out how & when I could assess patients coming in for urgent care as well as*
13 *patients already waiting for meds."* [C-11]

14
15 When participants were followed up at T3 to see whether they had successfully practised a goal set at
16 T2, just over a third (30.3%) agreed that they had achieved their goal to refer to clinical guidelines
17 more frequently, 29.3% had increased the number of urgent care cases they assessed and almost a
18 quarter (24.1%) had increased the number of clinical reviews (see Table 5).

19
20 <please insert Table 5 about here>

21
22 Reported extended scope of practice (primary outcomes)

23 At T3, participants were less likely to have reported applying the clinical examination techniques in
24 their practice compared to taking a structured history (see Table 6).

<please insert Table 6 about here>

All of the domains were correlated with the ability to take a structured history, with the strongest correlations with 'Beliefs about capabilities' and 'Behavioural regulation' domains. With the exception of the domain capturing professional role, all of the domains were also significantly associated with the ability to apply clinical examination techniques. The strongest correlations for this target behaviour were with the domains 'Intentions' and 'Behavioural regulation' (see Table 7 for details).

<please insert Table 7 about here>

Discussion

Community pharmacy has the potential to contribute to alleviating pressures in the healthcare system by extending the scope of community pharmacists' practice to the treatment and management of patients requiring urgent care. In the study reported here we sought to establish the extent to which training in the tasks and role required to provide urgent care was successful in changing community pharmacists' practice – a change in practice that would be likely to have an impact on models of health care delivery should it be implemented at scale within the health system. Moreover, by using the TDF to understand the experiences of pharmacists as they began to implement their training we have been able to identify how and why those who took part in the training had the capacity and motivation to expand their practice, and to identify infrastructural and organisational factors that limited opportunities for practice change. Focussing on self-report as indicators of practice change related to two target behaviours (primary outcomes), taking a structured history and applying clinical examination techniques to patients requiring urgent care, we found that participants were more likely to have taken a structured history than to have performed a clinical examination two months after they completed the training (median 5.5 vs 4). Reported behaviours related to managing patients and appropriate referral (secondary outcomes) further suggest ways that community pharmacy can improve access to treatment that extends beyond existing commissioned pharmacy-based services such as minor ailments schemes. However, situational factors including work overload, conflicting workloads, lack of equipment and concerns over insurance were cited as barriers to transfer of training suggesting practice setting characteristics remain an obstacle to implementing behaviour change, confirming previously reported findings that a lack of perceived behavioural control / ability to engage in a behaviour in a practice environment may prevent psychologically motivated and capable pharmacists from implementing an intended practice behaviour (Azjen, 1991; Luetsch, 2016; Liaskou et al., 2017; Doucette et al., 2012; Roberts et al., 2006; Hopp et al., 2005).

Using the theoretical domains framework (TDF) approach to measure the internal, psychological factors that account for aspects of behaviour change this study has sought to focus on the cognitive and affective influences on behaviour to gain insight into the mechanisms of behaviour change (Michie et al., 2005; Francis, O'Connor & Curran, 2012); the TDF has been used extensively in other studies designed to assess barriers or identify where to target resources to influence behaviour change for implementation projects for improving adherence to evidence-based indicators in primary care (Lawton et al., 2016) asthma management (Yamada et al., 2018) and clinicians' roles and responsibilities regarding human papillomavirus screening (McSherry et al., 2012). In our study, we measured eight of the domains using a psychometrically validated TDF data collection instrument (Huijg et al., 2014) and set out not only to identify change in domains pre- and post-intervention, but also to determine the extent to which change in these domains was sustained two months after the intervention. Whereas we found that five of the six domains measuring psychological motivation and capability factors relevant to understanding behaviour and behaviour change increased significantly between pre- and post-training and remained significantly higher two months after participants completed the training, one domain (intentions) was not affected; similarly of the domains measured only at follow-up (T2 and T3) analysis of behavioural regulation data suggests that reports of participants' ability to achieve their urgent care goals and remain focused on them were unchanged by the training intervention. Analysis also demonstrates that knowledge of urgent care, skills in urgent care referrals, beliefs about capabilities (or level of confidence about an ability to carry out appropriate urgent care referrals) and behavioural recognition in particular were associated with the target behaviours of the intervention. That our study has identified a number of key theoretical domains associated with the successful implementation and transfer of the training to practice adds to methodological arguments for the need to use psychological theory for understanding behavior change, rather than rely on judging the success of training on the basis that it has increased a single domain – typically, knowledge – as evidence.

As well as statistically significant increases in knowledge, skills and confidence, findings that the training changed participants' mind-set such that they now saw urgent care to be part of their professional role are of note. This is in spite of some respondents' comments suggesting potential barriers influencing successful implementation related to perceived difficulty in providing urgent care for patients in the context of an existing fee-for-service reimbursement model that incentivises quantity rather than quality service provision and prioritises dispensing and commercial interests over additional time-consuming tasks where pharmacists' scope of practice is extended (Hann et al., 2017). Thus although pharmacists may have good intentions about extending their role, and see this as part of their professional role, it is possible that, as others have found, when they are under pressure medicines-related activities will take precedence over, for example, time-consuming patient-centred consultations involved in urgent care practice (Rivers, Waterfield, Grootveld & Raynor, 2017; Law, Okamoto & Brock, 2009; Mansoor, Aslani & Krass, 2014). This may go some way towards explaining why only around one third of participants reported implementing the target behaviours of the training.

The above might suggest a gap between intentions to provide more clinical services and the technical dispensing tasks community pharmacists actually spend most time on (Schommer et al., 2006; Davies, Barber & Taylor, 2014). These barriers to implementation provide further evidence that changes to attitudes and behaviours alone are not enough for practice to change, and that a focus on the individual practitioner rather than on the structural, organisational context is a recognised shortcoming of studies that only consider psychological capacity and motivation. Moreover, while not explicitly investigated in this study, a lack of public or patient awareness of pharmacists' clinical roles (Eades Ferguson, & O'Carroll, 2011), as well as uncertainty regarding the numbers of patients presenting at community pharmacies requiring urgent care, together with reported lack of workbased support for providing services outside reimbursed dispensing, (Luetsch, 2016; Liaskou et al., 2017; Doucette et al., 2012; Roberts et al., 2006; Hopp et al., 2005) may limit opportunities to practise urgent

care. Further roll out of this type of training would need to consider these patient, structural, organisational and contextual factors and provide resources allowing for capacity-building beyond the individual level to meet (as yet unforecasted) patient demand.

Given these barriers to implementation, it is perhaps not unexpected that the rate of practice change was somewhat limited, with only around a third of participants reporting implementing their intended goals in practice, despite clearly defining how they would do so. In this respect, there appears to be some similarity with a review of studies of learning transfer, which found that the effectiveness of training in changing practice behaviours was estimated at being between 10-40% (Burke & Hutchins, 2007). However, as patient-centred consultation has been shown to have a positive effect on patients' health behaviours and outcomes (Dwamena et al., 2012), it is encouraging to note that all the domains were correlated with this target behaviour, suggesting that the training had in particular contributed to this behaviour being implemented in practice; conversely, that weaker associations were seen between the TDF domains 'skills', 'knowledge', 'beliefs in abilities' and the physical examination target behaviour suggests the training intervention could go further in developing physical examination skills, in common with a previous study that found limited training transfer of physical examination skills to practice amongst pharmacists (Barry, McCarthy & Nelson, 2012). Whether this limited transfer to practice is explained by pharmacists' identifying themselves primarily as medicines-experts or with patients' perceptions of pharmacists as medicines-advisors has yet to be determined (Luetsch, 2016; Eades et al., 2011).

Our study has, however, several limitations that restrict generalisability of the findings and mean that findings may need to be interpreted with some caution. Taking into account the study sample was small, with many lost to follow-up, there may be bias in response – and although the demographics of those taking part are broadly representative of the population from which they are drawn (Phelps et

al., 2014), it is likely that those taking part in the training were ‘early adopters’ of change who are choosing to extend their scope of practice and who may be psychologically different to the rest of the profession. A further methodological limitation is associated with the use of self-report of the behaviours investigated. This was used as it is difficult to measure practice behaviours objectively, but could have resulted in an over-estimation of the extent to which participants’ scope of practice had been extended, perhaps by as much as 20% (Adams et al., 1999). This study identified barriers to implementation through participants’ implementation intentions. However, a limitation of this study is that it did not include the TDF domains that assess the barriers, environmental and social context that may have impacted on implementation of their training in the survey tools. The researchers were therefore unable to quantify the impact that these factors had on the implementation of the training.

Despite these study limitations, our study has relevance to future pharmacy and health policy. We have shown that community pharmacists have the capacity to develop extended clinical skills that can support future models of care relevant to emerging roles for the profession, but that implementing these skills in practice may be limited by lack of opportunity, lack of patient demand or lack of support and infrastructure at the contextual, organisational and macro levels. Findings further suggest that behaviour change frameworks are useful in identifying and understanding how practice change takes place. Future studies will need to determine the unique contribution and value of community pharmacy, and should question how pharmacists are best utilised within the health system and how they might best take on more patient-focused roles.

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- 5

1

2 Table 1: TDF data collection questions and domains

Domain	Question	Measurement scale	Time point
Knowledge	I know the content and objectives of assessing and managing patients requiring urgent care	1= strongly disagree to 7= strongly agree	T1 T2 T3
	I know how to assess and manage patients requiring urgent care that attend my pharmacy		
Skills	I have been trained how to assess and manage patients requiring urgent care in my pharmacy	1= strongly disagree to 7= strongly agree	T1 T2 T3
	I have the proficiency to assess and manage patients requiring urgent care in my pharmacy		
	I have the skills to assess and manage patients requiring urgent care in my pharmacy		
Social/ professional role and identity	My role in assessing and managing patients requiring urgent care is clearly defined for me	1= strongly disagree to 7= strongly agree	T1 T2 T3
	With regard to assessing and managing patients requiring urgent care I know what my responsibilities are.		
Beliefs and capabilities	I am confident that I can assess and manage patients requiring urgent care in my pharmacy	1= strongly disagree to 7= strongly agree	T1 T2 T3
	I am confident that I can assess and manage patients requiring urgent care even when I am not motivated		
	I am confident that I can assess and manage patients requiring urgent care even when there is little time		
	For me, assessing and managing patients requiring urgent care is...	1= very difficult to 7= very easy	
	For me, assessing and managing patients requiring urgent care is: impossible to possible	1= impossible to 7= possible	
Intentions	I will definitely assess and manage a patient requiring urgent care in my pharmacy	1= strongly disagree to 7= strongly agree	T1 T2 T3
	How strong is your intention to assess and manage a patient requiring urgent care in your pharmacy?		
	How many of the next 10 patients requiring urgent care do you intend to assess and manage in your pharmacy?	Scored from 1-10	
Goals	I have a clear plan of how I will assess and manage a patient requiring urgent care in my pharmacy	1= strongly disagree to 7= strongly agree	T1 T2 T3
	I have a clear plan of under what circumstances I will assess and manage a patient requiring urgent care in my pharmacy		
	I have a clear plan when I will assess and manage a patient requiring urgent care in my pharmacy		
	I have a clear plan how often I will assess and manage a patient requiring urgent care in my pharmacy		
	I have a clear plan how to assess and manage patients requiring urgent care when there is little time		
Memory, attention and decision processes	Assessing and managing patients requiring urgent care following clinical guidelines is something I rarely forget	1= strongly disagree to 7= strongly agree	T2 T3
	When I need to concentrate to assess and manage patients requiring urgent care, I have no trouble focussing my attention		
	When trying to focus my attention on assessing and managing a patient requiring urgent care I have difficulty blocking out distracting thoughts		
	How often do you have to check clinical guidelines before you assess and manage patients requiring urgent care?	1= never to 7= almost always	
	To what extent do you know clinical guidelines on assessing and managing patients requiring urgent care by heart?	1= not at all to 7= very much so	

Domain	Question	Measurement scale	Time point
Behavioural regulation	Assessing and managing patients requiring urgent care in my pharmacy is something I do automatically	1= strongly disagree to 7= strongly agree	T2 T3
	I keep track of my overall progress towards assessing and managing patients requiring urgent care in my pharmacy		
	I tend to notice my successes whilst working towards assessing and managing patients requiring urgent care in my pharmacy		
	I am aware of my day-to-day behaviour as I work towards assessing and managing patients requiring urgent care in my pharmacy		

1

2

1 Table 2: Outcome behaviour questions

Outcome	Question	Measurement scale	Time point
Change in health systems behaviours	Since completing the training, I have practiced assessment and management of patients requiring urgent care.	1= strongly disagree to 7= strongly agree	T2 T3
	Since completing the training in assessing and managing patients requiring urgent care, my threshold for referral to other healthcare providers has changed		
	Since completing the training in assessing and managing patients requiring urgent care, I have reduced the number of patients I refer to their general practitioner		
	Since completing the training in assessing and managing patients requiring urgent care, I refer to a broader range of healthcare providers		
Change in target behaviours (scope of practice)	Having completed the training in assessing and managing patients requiring urgent care, to what extent have you been able to take a structured history from patients requiring urgent care..?	1= not at all to 7= very much so	T3
	Having completed the training in assessing and managing patients requiring urgent care, to what extent have you been able to apply the clinical examination techniques to patients requiring urgent care..?		

2

1

2 Table 3: Mean reported domain scores at T1, T2 and T3

Domain	Mean scores (Std.Dev)								F (p, df)
	T1 all respondents*	T1 (all surveys)	T2 all respondents	T2 (all surveys)				T3	
Knowledge	6.94 (2.5940)	7.00 (2.4905)	11.55 (1.5800)	11.71 (1.5927)			11.23 (2.1230)	11.26 (1.9947)	142.42 (0.000, 1.57, 98.99) ^a
Skills	8.26 (3.8294)	8.39 (3.7332)	16.56 (2.5484)	16.58 (2.6143)			16.44 (3.0537)	16.43 (2.8933)	184.41 (0.000, 1.51, 95.18) ^a
Social/ professional role and identity	6.21 (2.9255)	6.18 (2.8768)	10.47 (2.3314)	10.59 (2.3259)			10.70 (2.3208)	10.73 (2.3699)	85.25 (0.000, 1.68, 104.39) ^a
Beliefs about capabilities	16.95 (6.5925)	16.61 (6.1403)	25.71 (4.4476)	25.43 (4.3017)			25.84 (5.6024)	25.59 (5.4715)	89.00 (0.000, 1.83, 111.62) ^a
Intentions	17.59 (5.5920)	17.60 (4.9109)	18.73 (4.1904)	18.82 (4.0708)			18.73 (4.1904)	18.77 (4.3316)	2.17 (0.070, 2, 124) ^a
Goals	13.55 (6.8844)	13.34 (6.4528)	24.34 (5.9231)	24.54 (6.1766)			24.57 (6.0248)	24.85 (5.7573)	122.21 (0.000, 1.76, 109.11) ^a
Memory, attention and decision processes			21.32 (4.5485)	21.36 (4.4425)			22.49 (4.2868)	22.58 (4.1829)	4.69 (0.034, 1, 61) ^b
Behavioural regulation			19.53 (4.7977)	19.66 (4.5905)			19.56 (5.1135)	19.44 (5.3035)	3.27 (0.077, 1, 64) ^b

3 ^a One-way Anova with repeated measures ^b Paired samples t-test

4 *n=222, some missing values

5 T2 n=164

6 T3 n=104

7 All n= 81

1

2 Table 4: Reported healthcare system behaviours – secondary outcomes at T2 and T3

3

	Median score (inter quartile range)	
Since completing the training.....	T2	T3
I have practised assessment & management of patients requiring urgent care	5.00 (2)	6.00 (2)
My threshold for referral to other healthcare providers has changed	5.00 (3)	5.00 (2)
I have reduced the number of patients I refer to their general practitioner	5.00 (2)	5.00 (2)
I refer to a broader range of providers	5.00 (2)	5.00 (2)

4

1 Table 5: Reported goals achieved at T3

<i>Having completed the training, which of the following goals have you addressed?</i>	% addressed this goal
To undertake further training in assessing & managing patients requiring urgent care	19.0
To undertake further learning in assessing and managing patients requiring urgent care	25.4
To refer to clinical guidelines more frequently	35.1
To increase the number of clinical reviews undertaken	24.1
To increase the number of urgent care cases assessed	29.3

2

1 Table 6: Reported extended scope of practice (primary outcomes) at T3

Since completing the training....	Median score (inter quartile range) T3
To what extent have you been able to apply clinical examination techniques to patients requiring urgent care?	4.00 (3)
To what extent have you been able to take a structured history from patients requiring urgent care?	5.50 (1)

2

1 Table 7: Correlations between TDF domains and extended scope of practice (primary outcomes) at T3

	Since completing the training, to what extent have you been able to..	
	Take a structured history from patients requiring urgent care?	Apply the clinical examination techniques to patients requiring urgent care?
Knowledge	0.436 (0.000)	0.299 (0.015)
Skills	0.453 (0.000)	0.261 (0.034)
Social/ professional role and identity	0.318 (0.009)	0.232 (0.060)
Beliefs about capabilities	0.523 (0.000)	0.406 (0.001)
Intentions	0.492 (0.000)	0.486 (0.000)
Goals	0.379 (0.002)	0.437 (0.000)
Memory, attention and decision processes	0.340 (0.006)	0.313 (0.011)
Behavioural recognition	0.511 (0.000)	0.449 (0.000)

2 Correlation coefficient (p)

3

4